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Docket No. 50-213
A02352

Director of Nuclear Reactor Regulation
Attn: Mr. Dennis M. Crutchfield Chief
Operating Reactors Branch #5
U.S. Nuclear Regulatory Commission
Washington, DC 20555

References: (1) D. M. Crutchfield letter to W. G. Counsil dated March 5, 1982.

Gentlemen:

HADDAM NECK PLANT
SEP TOPIC VII-1.A, ISOLATION OF REACTOR PROTECTION SYSTEM FROM NON-SAFETY SYSTEMS, INCLUDING QUALIFICATION OF ISOLATION DEVICES

In Reference (1), the Staff forwarded the draft technical and safety evaluations for SEP Topic VII-1.A, Isolation of Reactor Protection System from Non-Safety Systems, Including Qualification of Isolation Devices, for the Haddam Neck Plant. Connecticut Yankee Atomic Power Company (CYAPCO) has reviewed Reference (1) and offers the following comments.

Section 3.1.1, Second Paragraph:

The linear amplifier designated LA-31 is incorrect. The correct designation is A-1.

The bistables supply a control signal for a dropped rod-rod stop, three power ranges (i.e., 10%, 24%, and 84%) of reactor power trips, and permissive circuits Nos. 7 and 8. The bistables do not supply a control signal for overpower-rod stop or rate of change of reactor power. The stop linear amplifier A-1 supplies control signals for overpower-rod stop, rate of change of reactor power and the above mentioned bistables.

The overpower-rod stop circuit is isolated from the linear amplifier (A-1) via an optical meter relay, and the rate of change of reactor power circuit is isolated from the linear amplifier (A-1) via operational amplifier (A-2).

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Section 3.1.1, "Evaluation"

The strip chart recorders are isolated from the power range analog signal by Electronic Modules Corporation emitter follower isolation amplifiers, not by Devar (formerly Bell & Howell) type 18-119-M31 isolation amplifiers. The Electonic Modules Corp. isolation amplifiers were supplied as original plant equipment, and meet the intent of IEEE Std. 279-1971. The remote power range meters are isolated by a 3.92 Kohm resistor.

Section 3.1.2, Second Paragraph, should read:

Four independent differential temperature (ΔT) signals from signal units (TT 412, TT 422, TT 432, and TT 442), monitoring the differential temperature across each of the four steam generators, along with four independent temperature averaged (Tavg) signals from signal units (TT 411, TT 421, TT 431, and TT 441), monitoring the average reactor coolant loop temperature across each of the four steam generators, provide input to three independent computer calculator units (PM 411, PM 412, and PM 413). On a continuous basis, each unit calculates a variable low pressure set point and transmits these set points through its respective low limiter unit (SL 411, SL 412, SL 413) to the three pressure comparator/bistable units. Each set point is compared with its respective pressure signal from the three independent pressurizer pressure transmitters (PT 401-1, PT 401-2, and PT 401-3) by three independent pressure comparator/bistable units (PA 401-1, PA 401-2 and PA 401-3). Each unit energizes a set of SCRAM relays (PA 401-1/63X, PA 401-2/63X and 63Y, and PA 401-3/63X and 63Y), where contacts from the SCRAM relays are arranged in a two out of three logic matrix in each of the three independent SCRAM channels (A, B, and the undervoltage (UV) bus trip).

Section 3.1.2, Third Paragraph, should read:

The three pressurizer pressure transmitters (PT 401-1, PT 401-2, and PT 401-3) also provide input signals to the three independent power operated relief valve controller units (PC 401-1A, PC 401-2, and PT 401-3). Each unit energizes its respective auxiliary relay (PC 401-1A/63X, PC 401-2/63X, and PC 401-3/63X), where contacts from the auxiliary relays are arranged in a two out of three logic matrix in each of the two power operated relief valve's (AOV's) circuitry. Each pressure signal also provides a voltage signal to the data logger from a 10 ohm resistor in the current loop.

Section 3.1.2, Fourth Paragraph, should read:

The four temperature averaged (Tavg) signal units (TT 411, TT 421, TT 431 and TT 441) also provide input signals to the Reactor Control System for alarm and control function via four current repeater units (TM-4X1J, TM-4X1K, TM-4X1L, and TM-4X1M) and a summing amplifier unit (TM-4X1D), respectively. The current repeater units and the summing amplifier unit are Foxboro equipment, Models 66B and 66C, respectively. Both the current repeater units and the summing amplifier unit provide electrical isolation between the input and output signals, with the summing amplifier unit also providing electrical isolation between the input signal terminals.

Section 3.1.2, "Evaluation":

The third sentence is incorrect and should state the following based on the above comments:

> Tavg signals provide input for both protection and control functions, with isolation between the Tavg signals and the alarm/control function. Thus the requirements of section 4.7.1 and 4.7.2 of IEEE Std. 279-1971 are met.

The last sentence should read:

> Bistable contacts from the power operated relief valve controller units (PC 401-1A, PC 401-2, and PC 401-3) operate auxiliary relays (PC 401-1A/63X, PC 401-2/63X, and PC 401-3/63X) which in turn operate the power operated relief valves. The auxiliary relays do provide adequate isolation between the RCS and the power operated relief valves.

Section 3.1.3, First Paragraph:

The second sentence is misleading and should state the following:

> The pressure transmitter (PT 401-1, PT 401-2 and PT 401-3) current loops provide a signal to the pressure comparator/bistable units (PA 401-1, PA 401-2, and PA 401-3). Each comparator/bistable unit also receives a signal from the computer calculator unit (PM-411, PM-412 and PM-413) by way of the low limiter units (SL-411, SL-412, SL-413).

Section 3.1.3, Second Paragraph:

The Thermovolt meter relays have been replaced with Sigma pressure indicating alarm units, utilizing the same nomenclature (PIA 401-1, PIA 401-2, and PIA 401-3).

Section 3.1.4, Second Paragraph, should read:

The three level transmitters (LT 401-1, LT 401-2, and LT 401-3) provide signals to their respective monitoring channels (current loop). Channel 1 current loop includes the level transmitter LT 401-1, power supply L 401-1, a bistable unit LA 401-1A, a process recorder/controller LRC 401-1, two bistable units LIC 401-1A and LIC 401-1, and an indicating alarm unit LIA 401-1. The indicating alarm unit (LIA 401-1) provides a digital signal to SCRAM relay LIA 401-1/63X. Contacts from the 63X SCRAM relay provide an input to a two out of three logic matrix in each of the three independent SCRAM channels (A, B, and undervoltage (UV) bus trip).

Section 3.1.4, Third Paragraph:

Contacts of the 63X and 63Y relays do not provide a two out of three logic to each of the three SCRAM trains A, B, and UV, but rather provide an input to a two out of three logic matrix in each of the three SCRAM channels (A, B, and undervoltage (UV) bus trip). The other inputs to the logic matrix are from the other two level channels.

Section 3.1.4, Fourth Paragraph, should read:

Channel 3 is the same as Channel 2 except the current loop includes a bistable unit (LIC 401-3). The contact output from the bistable unit energizes an auxiliary relay (LIC 401-3/63X), where contacts from the auxiliary relay control the pressurizer low level heater cut off and letdown valves closure. Also, the indicating alarm unit (LIA 401-3), which is in the current loop, provides a signal to SCRAM relays LIA 401-3/63X and 63Y. Contacts from the 63X and 63Y SCRAM relays provide an input to a two out of three logic matrix in each of the three SCRAM channels (A, B, and undervoltage (UV) bus trip).

Section 3.1.5, Third Paragraph, should read:

Flow transmitter (FT 401) feeds three independent bistable units (FIA 401A, FA 401B and FA 401C) where bistable units (FA 401B and FA 401C) energize their respective relays (63X/FA 401B and 63X/FA 401C). Contacts from relay (63X/FA 401B), 63X/FA 401C), and an output contact from bistable unit (FIA 401A) are arranged in a two out of three logic matrix to enable the SCRAM relays (63X/FIA 401 and 63Y/FIA 401) to operate. The other action to operate the SCRAM relays (63X/FIA 401 and 63Y/FIA 401) is by way of a mechanically operated switch from the 4160 volt switchgear circuit breaker for reactor coolant pump (P17-1). The contacts from the SCRAM relays (63X/FIA 401 and 63Y/FIA 401) are arranged with the other three reactor coolant flow channel SCRAM relays (63X/FIA 402, 63Y/FIA 402 and 63X/FIA 403; 63Y/FIA 403, 63X/FIA 404, and 63Y/FIA 404 to provide a one out of four logic matrix in each of the three independent SCRAM channels (A, B and the undervoltage (UV) bus trip). The matrix is combined with the Permissive eight contacts to provide a reactor trip when reactor power is above 84% full power. Also contacts from the SCRAM relays (63X/FIA 401, 63Y/FIA 401) are arranged with the other three reactor coolant flow channel SCRAM relays (63X/FIA 402, 63Y/FIA 402 and 63X/FIA 403; 63Y/FIA 403, 63X/FIA 404 and 63Y/FIA 404 to provide a two out of four logic matrix in each of the three independent SCRAM channels (A, B, and undervoltage (UV) bus trip). This matrix is combined with the Permissive eight and seven contacts to provide a reactor trip when reactor power is between 10% and 84% full power. There is no automatic reactor trip from reactor coolant flow channels for reactor power below 10% full power.

Section 3.1.5, Fourth Paragraph:

The mechanically operated reactor coolant pump cell switches are P17-1/52S, P17-2/52S, P17-3/52S, and P17-4/52S. The P17-1, P17-2, P17-3, and P17-4 designations are for the reactor coolant pumps.

The third sentence is misleading and should state the following:

> The M19 and M20 relay contacts are in the flow monitoring circuit and, upon the opening of a Reactor Coolant Pump breaker, supply voltage to its respective 63X & 63Y FIA Scram Relays is interrupted causing the Flow monitoring channel to log a loss of flow trip. In addition, several other contacts of the mechanically operated breaker cell switch interface with the Reactor Trip circuit directly in a 2/4 configuration below P-8 and 1/4 configuration above P-8 in each of the three independent Scram channels (A, B, and undervoltage bus trip).

Section 3.1.5, Fifth Paragraph:

The undervoltage relays 271A and 271B, as stated in the report, are actually 271A, 271A1 and 271B, 271B1 on the 4160V buses 1A and 1B respectively.

The undervoltage relays (271A and 271A1, 271B and 271B1) feed auxiliary relays 27X1A and 27X1B, respectively.

Section 3.1.5, Sixth paragraph:

The report stated, "It could not be determined if each of the flow monitor channels provides inputs to the data logger and process recorders," however, we have determined that the flow monitors channels (F 401, F 402, F 403 and F 404) do provide inputs to the data logger and not the process recorders.

Section 3.1.6, Second Paragraph:

The Thermovolt meter relay units discussed in this paragraph have been replaced with Sigma indicating bistable alarm units. The same nomenclature (i.e. PIA 401-1, 2, and 3) applies to the Sigma units.

Section 3.1.7, Third Paragraph:

The referenced manufacturer's name "Dahl" for steam flow transmitter FT 1201-1, is incorrect. The manufacturer's name for the steam flow transmitters (FT 1201-1, 2, 3 and 4) is "Hagan". The manufacturer's name "Dahl" applies to the steam flow sensors (FE 1201-1, 2, 3, and 4).

Section 3.1.7., Fourth Paragraph:

The four steam flow and the four feedwater flow transmitters do not provide a voltage signal to the data logger.

Section 3.1.7, "Evaluation":

The statement, "the input signal to the two-pen recorders and to the data logger from the steam flow and feedwater flow system are not adequately isolated from the reactor protection system", is not totally correct. The steam and feedwater flow system does not provide an input signal to the data logger.

The statement, "the steam and feedwater flow channels input signals to the steam and feedwater flow controller without isolation for the RPS". is not entirely correct. There does not exist a steam flow controller, but only a feedwater flow controller.

Section 4.0.1; because of the above corrections, this section should read:

Isolation of RPS monitoring channels from other measuring parameters does not meet current licensing criteria in the following subsystems:

a) Pressurizer pressure channels from the data logger and process recorders.

b) High pressurizer level channels from the data logger and process recorders.

c) Steam/feedwater flow mismatch channels (i.e. Steam flow, feedwater flow and steam generator level) from the process recorders.

Section 4.0.2.a: because of the above correction to section 3.1.2, fourth paragraph, and section 3.1.2, "Evaluation"; this section should be removed.

Section 4.0.2.b: because of the above correction to section 3.1.7, "Evaluation"; this section should read:

The Steam flow and feedwater flow signals, which provide input to the steam/feedwater flow mismatch circuit for reactor trip, interfaces the feedwater flow controller without isolation. The steam generator level signals, which provide a reactor trip signal in coincidence with the steam/feedwater flow mismatch circuit, interface the steam generator level controller without isolation.

We trust the staff will appropriately incorporate the above comments into a revised Safety Evaluation Report for this SEP topic.

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY

W. G. Counsil

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Senior Vice President